

EPSON

32KB

Serial Interface Card

C82307 *

C823088 *

English
Deutsch
Français
Español
Italiano

4000273
C01-00

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- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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The connection of a non-shielded printer interface cable to this printer will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment. If this equipment has more than one interface connector, do not leave cables connected to unused interfaces.

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32KB Serial Interface Card
C82307* / C82308*

English

32-KB-Schnittstellenkarte
C82307* / C82308*

Deutsch

Carte d'Interface série 32Ko
C82307* / C82308*

Français

Módulo de interface en serie de 32KB
C82307* / C82308*

Español

Scheda dell'interfaccia seriale da 32KB
C82307* / C82308*

Italiano

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INTRODUCTION

The Serial Interface Card C82307 * /C82308 * is an interface that allows asynchronous serial data communication between a host computer and an EPSON printer.

This interface card offers the following features:

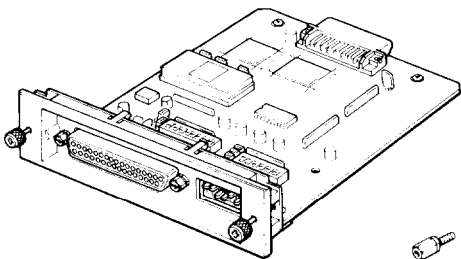
- A 32K byte buffer that frees up your computer for other uses while your printer continues to print
- Two self-test functions that can help solve interface problems
- Data transmission that can be set at either RS-232D, RS-422A, or 20-mA Current-Loop levels (RS-232D has been revised from the former RS-232C. Set the signal levels for RS-232D the same as for RS-232C.)
- Handshaking protocol using X-on/X-off or DTR flag control
- Selectable data word structure that allows you to choose parity (Odd, Even, None, or Ignore) and word bit settings (either 7 or 8 bit)
- Selection of baud-rate settings from 75 to 38,400 BPS (Data transmission speed is limited to 19,200 BPS when interface is set to either RS-232D or 20-mA Current-Loop.)
- DIP-switch 1 settings that you can change even after installation

About this guide

This guide is designed to give you detailed information on how to install your C82307 * /C82308 * serial interface card in a variety of EPSON printers. Installation procedures vary slightly depending upon the printer model that you have.

Also included are instructions on how to adjust the settings of the C82307 * /C82308 * interface card, as well as a general description of serial data communication.

The C82307 * /C82308 * option package contains the following items:



C82307*
C82308* serial I/F card (1)



Optional connector lock nuts (2)

Note

When attaching the interface cable to the interface, you may find that the screws of your interface cable do not fit into the connector lock nuts. If this happens you will need to replace the connector lock nuts with the optional ones provided in this package.

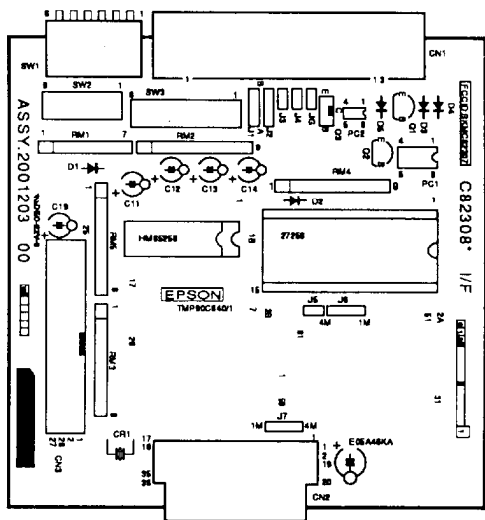
SETTING THE CONDITIONS

The C82307 * /C82308 * interface card has three sets of DIP (Dual In-line Package) switches, and eight jumpers. These switches and jumpers are used for selecting various interface operations.

Card layout

The figure below shows the layout of the C82307 * KS2308 * card, and the locations of the DIP switches and jumpers.

Figure 1. Card layout



DIP switch and jumper settings

Before you install the C82307* /C82308* interface, you may need to adjust the DIP-switch 2, DIP-switch 3, and jumper settings. You can change the DIP-switch 1 settings after you install the interface. When making DIP-switch setting changes, it is best to use a pointed device, such as a ball-point pen or small screwdriver.

Caution

All changes of DIP-switch and jumper settings should be made with the printer power turned off. New settings become valid only when the printer is turned on.

DIP switches

The settings on DIP switches allow you to change interface functions. The three sets of DIP switches on the C82307* /C82308* are labelled SW1, SW2, and SW3. Each set contains a number of individual toggle-type switches that can be set either on or off. The individual switches are referred to by set (SW1, SW2, or SW3) and number. Therefore, the switch in set SW1 marked by the small number 3 is called DIP switch1-3.

DIP switch 1 (interface operations)

The tables below contain information on switch functions, and the factory setting of each.

Table 1. DIP switch 1

Switch number	Function	ON	OFF	Factory setting
1-1	I/F card enable/disable (Note)	Enable	Disable	ON
1-2	Word length	8 bit	7 bit	ON
1-3	Parity check selection 1	See Table 3.		OFF
1-4	Parity check selection 2			OFF
1-5	Baud rate selection 1	See Table 5.		ON
1-6	Baud rate selection 2			OFF

Note

Some printers have a selecting switch (or function) that allows you to select between the optional and original interfaces. If you install the interface card in this type of printer, you should set DIP switch 1-1 on the interface card to ON and also change the setting in the printer to select the optional interface.

Data word structure

The data word structure is also operator selectable through DIP-switch settings (See Table 1). The word structure for serial data is:

1 start bit +7 or 8 data bits (selectable) + 1 parity bit (selectable) +1 or more stop bits.

The table below shows the possible word structure combinations.

Table 2. Word structure

Start Bit	Data Bit	Parity Bit	Stop Bit
1	7	No parity	1 or more
1	7	Odd parity	1 or more
1	7	Even parity	1 or more
1	8	No parity	1 or more
1	8	Odd parity	1 or more
1	8	Even parity	1 or more

You can select the parity check method with DIP-switch settings (See Table 3).

Table 3. Parity check

DIP switch 1-3	DIP switch 1-4	Parity check
OFF	OFF	No parity bit
OFF	ON	Ignore parity
ON	OFF	Odd parity check
ON	ON	Even parity check

DIP switch 2 (interface operations)

The tables below contain information on switch functions, and the factory setting of each.

Table 4. DIP switch 2

Switch number	Function	ON	OFF	Factory setting
2-1	Baud rate selection 3	See Table 5.		ON
2-2	Baud rate selection 4			ON
2-3	Handshaking protocol selection 1	See Table 7.		OFF
2-4	Handshaking protocol selection 2			OFF
2-5	Interface selection 1	See Table 8.		OFF
2-6	Interface selection 2			OFF

Baud rate selection

In serial data communication, data is transmitted in the form of bits. These data bits go out one at a time along a single path, and in a specified order. The BPS (Bits Per Second) rate, or speed at which these bits are transmitted, can be selected using a combination of DIP-switch settings.

Note

In either RS-232D or Current-Loop mode, accurate data transfer cannot be guaranteed at a baud rate exceeding 19,200 BPS.

Table 5. Baud rate selection

Baud rate (BPS)	DIP Switch			
	SW 2-1	SW 2-2	SW 1-5	SW 1-6
19,200	ON	ON	ON	ON
9,600	ON	ON	ON	OFF
4,800	ON	ON	OFF	ON
2,400	ON	ON	OFF	OFF
1,800	ON	OFF	ON	ON
1,200	ON	OFF	ON	OFF
600	ON	OFF	OFF	ON
300	ON	OFF	OFF	OFF
200	OFF	ON	ON	ON
150	OFF	ON	ON	OFF
134.5	OFF	ON	OFF	ON
110	OFF	ON	OFF	OFF
75	OFF	OFF	ON	ON
9,600	OFF	OFF	ON	OFF
19,200	OFF	OFF	OFF	ON
38,400	OFF	OFF	OFF	OFF

Handshaking selection and Interface selection

The table below shows the relation between handshaking selection and interface selection.

Table 6. Handshaking and interface

Handshaking	RS-232D selected	RS-422A selected	Current Loop selected
DTR Flag Handshaking	TXD: MARK always DTR: Flag output	SDA, SDB: MARK always TRA, TRB: Flag output	TTY-TXD/ TTY-TXD Return: Flag output DTR: Fixed
X-on/X-off Handshaking	TXD: X-on/X-off DTR: Fixed	SDA, SDB: X-on/X-off TRA, TRB: Fixed	TTY-TXD/ TTY-TXD Return: X-on/X-off DTR: Fixed

Note

- In RS-422A mode, selecting DTR handshaking outputs the DTR flag through the DTR pin (No. 20); selecting X-on/X-off handshaking, fixes the value of the DTR
 - The signal is always in a fixed, flag reset state. Signal polarity can be inverted with DIP switch 3-4.
-

Table 7. Handshaking protocol selection

DIP switch 2-3	DIP switch 2-4	Handshaking protocol
OFF	OFF	DTR handshaking protocol
OFF	ON	X-on/X-off handshaking protocol
ON	OFF	Not used
ON	ON	Not used

Table 8. Interface selection

DIP switch 2-5	DIP switch 2-6	Interface
OFF	OFF	RS-232D
OFF	ON	RS-422A
ON	OFF	Current Loop
ON	ON	Not used

DIP switch 3 (Interface operation)

The tables below contain information on switch functions, and the factory setting of each.

Table 9. DIP switch 3

Switch number	Function	ON	OFF	Factory setting
3-1	Buffer operation enable/disable selection	Disable	Enable	OFF
3-2	Buffer full recovery (flag reset) timing 1	See Table 10.		OFF
3-3	Buffer full recovery (flag reset) timing 2			OFF
3-4	Flag (DTR) positive/negative polarity selection	Negative	Positive	OFF
3-5	DSR/DCD signals enable/disable selection	Enable	Disable	OFF
3-6	DTR flag set/X-off transmit timing	512 byte	16 byte	OFF
3-7	Self-test enable/disable selection	Enable	Disable	OFF
3-8	Self-test selection	Line monitor	Loop back	OFF

Note

- Buffer full recovery timing (DIP switch 3-2 and 3-3) and DTR flag set/X-off transmit timing (DIP switch 3-6) selections are enabled only when buffer operation is enabled (DIP switch 3-1 is OFF). If SW3-1 is ON, buffer full recovery timing is set to 32 bytes and DTR flag set/X-off transmit timing is set to 16 bytes.
 - DSR/DCD signals (DIP switch 3-5) are enabled when RS-232D is selected.
-

Buffer full recovery timing

When the available space for bytes in the print buffer drops to 512 or 16 bytes, data entry is disabled. As the printer prints the data in the buffer, the vacant area for bytes increases. When this vacant area reaches one of the four values listed in the table below, data communication is resumed. These settings are selectable by using the DIP switches.

Table 10. Buffer full recovery timing

Vacant area for bytes in the print buffer	DIP switch	
	SW 3-2	SW 3-3
768	OFF	OFF
1024	OFF	ON
2048	ON	OFF
4096	ON	ON

Jumpers

The jumper is a small terminal used for connecting or disconnecting a circuit. The jumper is on when the jumper plug covers both wires of the terminal. Jumper settings can be changed by either attaching or removing the rectangular jumper plug. If the jumper is to be turned off, connect it to just one of the two terminal pins as shown in the figure below. By doing this, you can avoid losing the unused jumper plug.

Figure 2. Jumpers

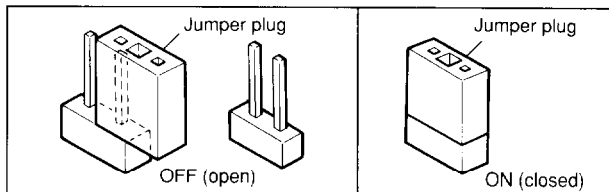


Table 11. Jumper settings

Jumper			Function			Factory Setting
J1	A	ON	Host computer is not equipped with a current source for Current-Loop transmitting (Non-isolated). (See Note)	OFF	Host computer is equipped with a current source for Current-Loop transmitting (Isolated). (See Note)	ON
	B	OFF		ON		OFF
J2	A	ON		OFF		ON
	B	OFF		ON		OFF
J3	ON		OFF		ON	
J4	ON		Receive RDA through pin No. 3 at RS-422A	OFF	Receive RDA through pin No. 16 at RS-422A	OFF
J5	Preset				(See Note)	—
J6	Preset				(See Note)	—
J7	Preset				(See Note)	—
JG	ON: Connects Shield Ground to Signal Ground					OFF

Note

- If the host computer is not equipped with a power supply for the Current-Loop interface, jumpers J1, J2, and J3 must be connected for communications via the Current-Loop interface.
- When Current-Loop is selected, see the section on circuit diagrams to determine the correct current source and current return.
- J5, J6, and J7 jumpers are connected at the factory; you should not change these settings.

DATA ENTRY

This section gives a brief description of serial data communication conditions and handshaking protocols supported by the C82307* /C82308* interface card.

Serial data communications

The C82307* /C82308* interface allows you to select either RS-232D, RS-422A, or 20-mA Current-Loop signal levels for data communication.

This interface card also provides for either DTR (Data Terminal Ready) or X-on/X-off handshaking protocol.

About data entry

To accommodate data entry, the C82307* /C82308* interface card is equipped with a buffer that temporarily stores data before transferring it to the printer. When this buffer becomes full, any additional transmitted data cannot be accepted and is discarded. To prevent such data loss, special handshaking protocols are provided to regulate the flow of data transmission. The two protocols available on the C82307* /C82308* interface card are DTR and X-on/X-off.

To enable data entry to the buffer while RS-232D is selected, DSR and DCD must be held at the positive EIA RS-232D level (SPACE) or DIP switch 3-5 must be OFF. When DIP switch 3-5 is ON and either DSR or DCD is set to the negative EIA RS-232D level (MARK), all received data will be ignored by the interface card.

Note

When a parity error occurs (if parity check is enabled), framing or overrun errors are detected in the data received, and data is either ignored or an asterisk (*) is printed instead.

Handshaking protocol

X-on/X-off Protocol

X-on/X-off protocol is a system in which the printer transmits a code to the computer to indicate that it cannot accept more data, and a second code when it is once again ready. This protocol can be performed under either RS-232D, RS-422A, or 20-mA Current-Loop signal levels.

The C82307* /C82308* interface card sends an X-on (11H) code when it is ready to receive data, and an X-off (13H) when it is busy. The X-on/X-off signals may be transmitted from the TXD terminal (pin No. 2) at RS-232D signal levels, through the SDA and SDB terminals (pin No. 9, 10) at RS-422A signal levels, or through the TTY-TXD terminal (pin No. 17) at 20-mA Current-Loop signal levels.

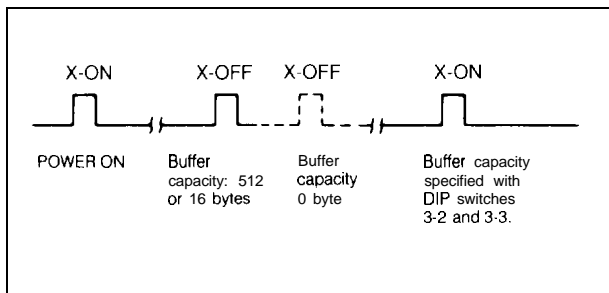
After the X-on flag has been set, data can be accepted up to the maximum capacity of the buffer.

- *Transmit timing of the X-off signal*
The X-off signal is transmitted when the vacant area for bytes in the buffer drops to flag set level.
- *Data transfer after X-off signal*
Data can be sent to the printer even after the X-off signal is transmitted as long as sufficient room for data remains in the buffer. However, if the transmitted data exceeds the vacant area in the buffer, it will be discarded. The X-off character will be transmitted again when the remaining buffer capacity is actually 0 bytes. At that time, a BS code (08H) and "/" character (2FH) will be sent to the printer.

- *Transmit timing of the X-on signal*

The X-on signal is transmitted when the power is first turned on, and when the vacant area in the buffer is greater than the preset value of the buffer recovery timing. Refer to Table 12 for information on flag set/reset conditions.

Figure 3. X-on/X-off timing



DTR protocol

This interface card also provides for DTR handshaking protocol using either RS-232D, RS-422A, or Current-Loop signal levels.

Under this system, when the printer is turned on the DTR enters the SPACE state, meaning that data entry is enabled. When the rate of data reception is greater than that of printing, the buffer gradually fills up. Once the vacant area for transmitted bytes drops to flag set level, the DTR sets the status flag to prohibit further data entry. This flag is output through the DTR (pin No. 20) under RS-232D signal levels, through the TRA and TRB (pin No. 11, 13) under RS-422A signal levels, and through the TTY-TXD (pin No. 17) under Current-Loop levels.

With the status flag set and data reception prohibited, the vacant area of the buffer gradually increases as the printer continues to print. When the vacant area for bytes reaches the preset recovery value (see Table 12), the flag is reset and data entry is again enabled.

Buffer Operation Disabled

Under this condition, the flag is output from the DTR (pin No. 20) in the case of RS-232D, from the TRA and TRB (pin No. 11, 13) in the case of RS-422A, and from the TTY-TXD (pin No. 17) in the case of Current Loop.

When DIP switch 3-1 is ON (buffer is disabled), flag set timing is set to 16 bytes and flag reset timing is set to 32 bytes.

Table 12. Flag set/reset conditions

	DTR Handshaking	X-on/X-off handshaking
Flag is set (not ready to accept data)	RS-232D: negative EIA level RS-422A: negative EIA level TRA-TRB, TRA: inverted TRB: noninverted 20-mA Current Loop: low impedance (Current on)	Transmitting X-off character
Flag is reset (ready to accept data)	RS-232D: positive EIA level RS-422A: positive EIA level TRA-TRB TRA: inverted TRB: noninverted 20-mA Current Loop: high impedance (Current off)	Transmitting X-on character

Flag set timing is selectable with DIP switch 3-6, and flag reset timing is selectable with DIP switches 3-2 and 3-3.

Printer status error

The flag is set immediately, regardless of the remaining buffer capacity, if the printer detects an error.

SELF TEST

Two self-test modes can be selected by DIP switches 3-7 and 3-8. To select a self-test mode, first turn off the power to the printer and then change the DIP-switch setting. When the power is turned back on, the new settings automatically go into effect. To exit from the self test, turn off power and reset the DIP switches.

Table 13. Self-test modes

SW 3-7	SW 3-8	Mode
ON	OFF	Loopback
ON	ON	Line monitor

Loopback mode

Turning the power on during loopback mode causes the interface card to first check the RAM, and then print the RAM capacity and DIP-switch settings. The interface then sends the character codes 30H to 39H, followed by a line feed command (0AH), to the printer eight times.

See Table 14. for the terminal pin connections necessary with your selected interface type.

Table 14. Terminal pin connections

Interface selection	Transmitting terminal pin/ Receiving terminal pin
RS-232D	Pin No. 2 (TXD) Pin No. 3 (RXD)
RS-422A	Pin No. 9 (SDA) Pin No. 16 (RDA) Pin No. 10 (SDB) Pin No. 18 (RDB)
Current Loop	PinNo.17 (TTY-TXD) PinNo.25 (TTY-RXD) PinNo.24 (TTY-TXDReturn)..... PinNo.23 (TTY-RXD Return) • In this case, the jumper must be set as follows: J1-A is ON, J2-A is ON, and J3 is ON

Line-monitor mode

During this test, data on the RS-232D line, RS-422A line, or Current-Loop line is printed in hexadecimal code. The only difference between normal operation and this mode is that all data is converted into hexadecimal form.

SPECIFICATIONS

1. Synchronization: Asynchronous
2. Baud Rate: RS-232D: 75, 110, 134.5, 150, 200, 300, 600, 1,200, 1,800, 2,400, 4,800, 9,600, or 19,200 BPS (selectable)
RS-422A: 75, 110, 134.5, 150, 200, 300, 600, 1,200, 1,800, 2,400, 4,800, 9,600, 19,200, or 38,400 BPS (selectable)
Current Loop: 75, 110, 134.5, 150, 200, 300, 600, 1,200, 1,800, 2,400, 4,800, 9,600, or 19,200 BPS (selectable)
3. Word length:
Start bit: 1 bit
Data bit: 7 or 8 bits (selectable)
Parity bit: Odd, even, none, or ignore (selectable)
Stop bit: 1 bit or more
4. Input signal polarity:
 - 1) RS-232D:
MARK = logic "1" (- 3 to - 25V)
SPACE = logic "0" (+ 3 to + 25V)
 - 2) RS-422A:
MARK = logic "1"
The RDA is negative (- 0.2 V to - 6 V)
with respect to the RDB.
SPACE = logic "0"
The RDB is positive (+0.2 V to +6 V)
with respect to the RDB.
RDA: Inverted RDB: Noninverted
 - 3) Current loop:
MARK = logic "1" (Current on)
SPACE = logic "0" (Current off)

5. Handshaking

Table 15. Handshaking

	Using DTR protocol	Using X-on/X-off protocol
RS-232D	The signal at pin No. 20 is as follows; MARK—data transfer disabled SPACE—data transfer enabled (Signal polarity can be inverted by DIP-switch setting.)	Data transmitted from pin No. 2 is controlled as follows; X-on (11H)—data transfer enabled X-off (13H)—data transfer disabled
RS-422A	The signal at pin No. 11 with respect to pin No. 13 is: MARK—data transfer disabled SPACE—data transfer enabled (Signal polarity can be inverted by DIP switch setting.)	Data transmitted by the differential voltage of pin No. 9 to pin No. 10 is controlled as follows: X-on (11H)—data transfer enabled X-off (13H)—data transfer disabled
Current Loop	The impedance between pin No. 17 and pin No. 24 is as follows; LOW (MARK)—data transfer disabled HIGH (SPACE)—data transfer enabled (Signal polarity can be inverted by DIP-switch setting.)	Data transmitted by the change of the impedance between pin No. 17 and pin No. 24 is controlled as follows; X-on (11H)—data transfer enabled X-off (13H)—data transfer disabled

HARDWARE DESCRIPTION

1. I/F board connector: EIA standard 25-pin D-SUB female connector.
2. For signal description and pin assignment, refer to the table below:

Table 16. Signal Description and Pin Assignment

Pin No.	Signal Name	Signal level			Direction*	Description
		RS-232D	RS-422A	Current Loop		
1	Shield ground	○			—	Chassis ground
2	Transmitted Data (TXD)	○			Out	Transmitted serial data
3	Received Data (RXD/RDA)	○	○		In	Received serial data Set jumper J4 to receive RDA.
4	Request to Send (RTS)	○			Out	Always the positive EIA level
5	Clear to Send (CTS)	○			In	No operation
6	Data Set Ready (DSR)	○			In	Must be at positive EIA level (SPACE) for printer to receive data
7	Signal Ground	○			—	Return path for data and control signals
8	Data Carrier Ready (DCD)	○			In	Must be at positive EIA level (SPACE) for printer to receive data

Pin No.	Signal Name	Signal level			Direction*	Description
		RS-232D	RS-422A	Current Loop		
20	Data Terminal Ready (DTR)	○			Out	Positive EIA level when the printer is ready to accept data entry, and negative EIA level when the printer is not ready to accept data entry. Operator can invert the polarity of this signal with DIP switch 3-4.
9	Transmitted Data (SDA)		○		Out	Transmitted serial data inverted.
10	Transmitted Data (SDA)		○		Out	Transmitted serial data noninverted.
11	Terminal Ready (TRA)		○		Out	The differential voltage of TRA to TRB (TRA-TRB) is the positive EIA level when the printer is ready to accept data entry, and the negative EIA level when the printer is not ready to accept data entry (TRA: inverted, TRB: noninverted). Operator can invert the polarity of this signal with DIP switch 3-4.
13	Terminal Ready (TRB)		○		Out	
16	Received Data (RDA)		○		In	Received serial data inverted
18	Received Data (RDB)		○		In	Received serial data noninverted

Pin No.	Signal Name	Signal level			Direction*	Description
		RS-232D	RS-422A	Current Loop		
17	TTY-TXD			○	Out	High impedance (SPACE) between pin No. 17 and No. 24 or an X-on signal sent across pin No. 17 and No. 24 indicates that the printer is ready to accept data; low impedance (MARK) or an X-off signal being set indicates that the printer is busy. Operator can invert the polarity of this signal with DIP switch 3-4.
24	TTY-TXD Return			○	—	Current return for pin No. 17
25	TTY-RXD			○	In	Input data of serial Current Loop.
23	TTY-RXD Return			○	—	Current return for pin No. 25

Note

The column heading "Direction" refers to the direction of signal flow as viewed from the printer.

CIRCUIT DIAGRAMS

RS-232D Transmitter/Receiver Circuit Diagrams

Figure 4. Transmitter Circuit Diagram

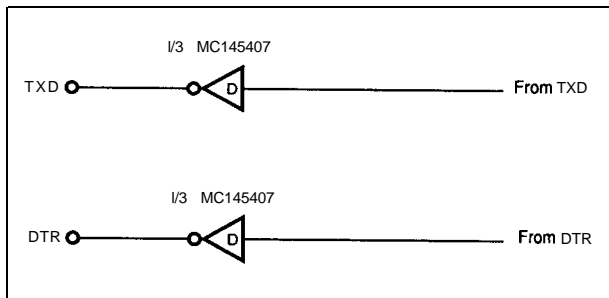
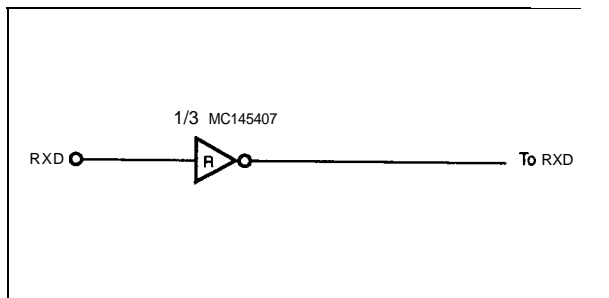


Figure 5. Receiver Circuit Diagram



RS-422A Transmitter/Receiver Circuit Diagrams

Figure 6. Transmitter Circuit Diagram

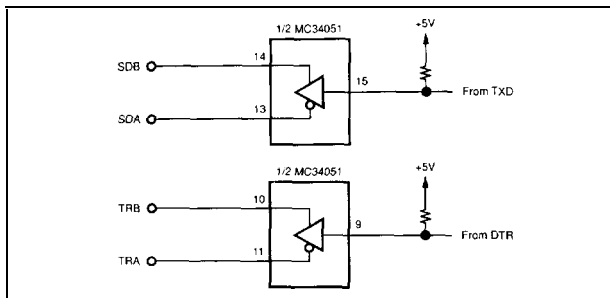
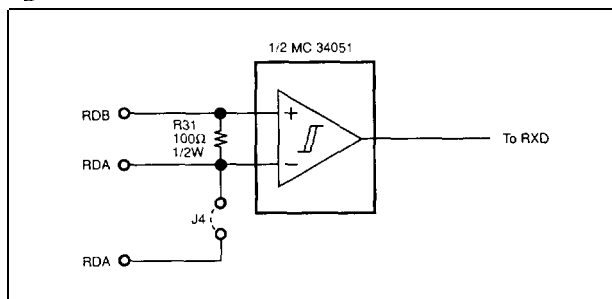


Figure 7. Receiver Circuit Diagram



Current-Loop Transmitter/Receiver Circuit Diagrams

Figure 8. Transmitter Circuit Diagram

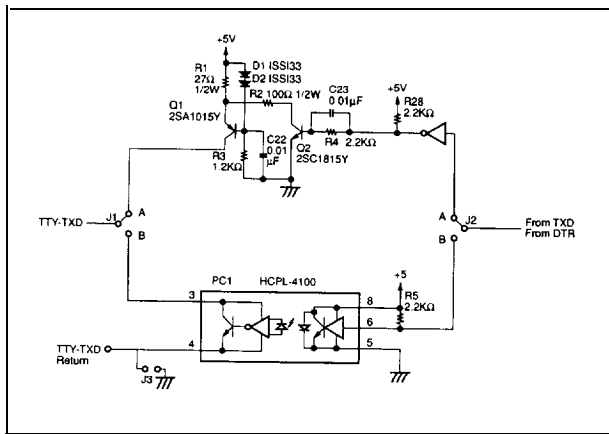
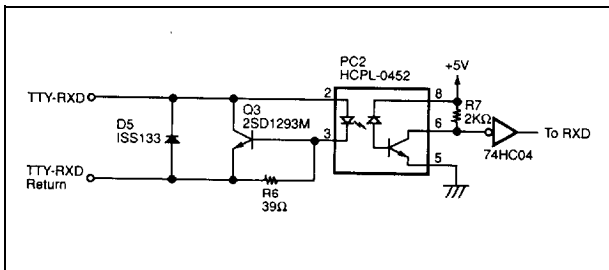


Figure 9. Receiver Circuit Diagram



Note

Set Jumpers J1, J2, and J3 referring these diagrams.

INSTALLATION

The C82307* /C82308* interface card is designed to be installed inside the printer. Installation or removal of the interface card is easy, and requires only a screwdriver.

The following section gives you detailed information on how to install your interface card in a variety of EPSON printers.

Caution

- Turn off the power to the printer and the computer before installing the interface card. Make sure that all power and interface cables are removed.
- Avoid touching the printer's circuit board contacts, as many of these components are sensitive to static electric charges that may build up on your body.

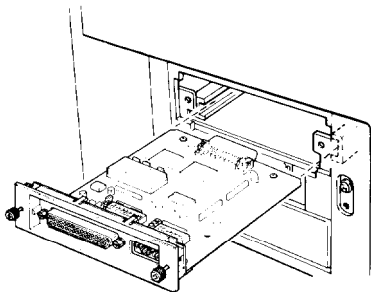
-
1. First, adjust DIP switches and jumpers settings, as necessary.

If the screws don't fit your interface cable, you will need to replace the connector lock nuts with the optional ones provided in this package.

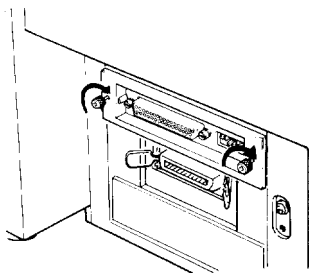
Note

The original C82307* lock nuts are imperial standard (inch), and the C82308* lock nuts are metric.

2. Fit both sides of this interface card into the guides inside the compartment.



3. Insert this interface card until the interface pins mate with the connector inside your printer.
4. Secure the interface with the two screws.



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